Sun™ Ultra™ 30

Just the Facts

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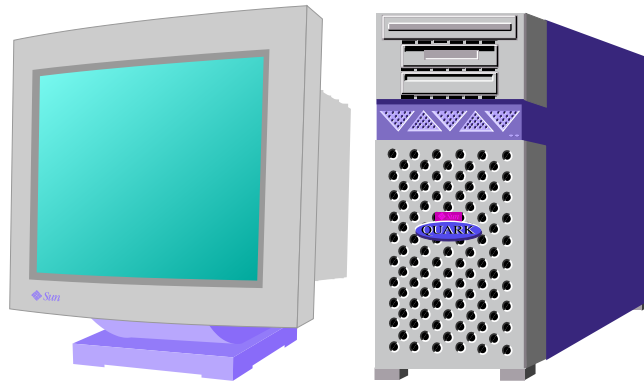# Sun™ Ultra™ 30 Systems Positioning

Introduction

Figure 1. The Ultra 30 System

Continued Commitment to UltraComputing™

Very-High-Performance Graphics and Network, I/O, UltraSPARC™-II Processing Power

The Sun™ Ultra™ 30 workstation raises UltraComputing™ to entirely new levels: next-generation processing power with UltraSPARC™-II processors, new Creator Graphics technology, new UltraSCSI disks, and introducing an innovative high-performance Peripheral Component Interconnect (PCI) I/O bus. With the new minitower system enclosure, UltraComputing is now more modular and expandable, providing a platform for access to new performance and technology options. Sun's commitment to high-performance computing and UltraComputing means the new Ultra 30 system delivers increasing levels of industry leading performance and preserves binary compatibility with application software. The new performance levels will enable a whole new class of applications to be realized and used in the workstation environment.

Sun Ultra 30 Systems

The modular Sun Ultra 30 systems are available in two different processor configurations: Model 250 and Model 300. Both systems include the highly-integrated Creator Graphics, which provides high performance and comprehensive range of graphics functionality without the high cost of conventional "large, expensive frame buffer through I/O bus" technology used by the competition.

The Ultra 30 system continues the Sun tradition of delivering balanced system design and innovation. The powerful Ultra Port Architecture (UPA), introduced on the original Ultra systems, continues in the Ultra 30 system with new enhancements. It now includes a memory interleaving mode with double the memory capacity of the Ultra 1, and dual UPA graphics slots to support up to two Creator Graphics driven monitors. The new UltraSCSI disk technology has doubled the disk I/O performance.

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Sun Ultra 30 Systems *(cont.)*

The Ultra 30 is Sun's first system to deliver the industry standard PCI I/O bus, enabling access to hundreds of expansion and networking options. Sun has added innovation to the Ultra 30 system PCI I/O bus with dual bus channels ensuring sustained high-performance to the system's PCI slots. In addition, Sun is the first system in the industry to deliver the 66-MHz PCI, which is capable of a whopping 200 MB per second throughput ideal for high-performance networking requirements.

The new Ultra 30 is *not* just an Ultra system with PCI slots. All UltraComputing technologies have been scaled to higher performance UltraSPARC-II processing power, UPA interconnect with memory interleaving and dual Creator Graphics support, UltraSCSI disk technology and new generation Creator Graphics. It also introduces a revolutionary and innovative, multiple channel PCI bus—with the first 66 MHz capability. Ultra 30 demonstrates that UltraComputing, which began with the Ultra 1, delivers increasing industry-leading performance and preserves compatibility with existing application software. Ultra systems will continue to set high standards for both the RISC and high-end PC competition.

Product Family Placement

The Ultra 30 is the newest addition to the current desktop product family, which scales from the innovative, low-cost JavaStation™, to the low-cost, high-performance Ultra 1, and up to the 14-way multiprocessing Ultra 4000.

The Ultra systems have several things in common, including:

- The SPARC™ processor
- Binary compatible from the low-end to the high-end, including Sun's server family
- Scalable from the low-end to the 14-way Ultra 4000.
- Modular—easy to swap components
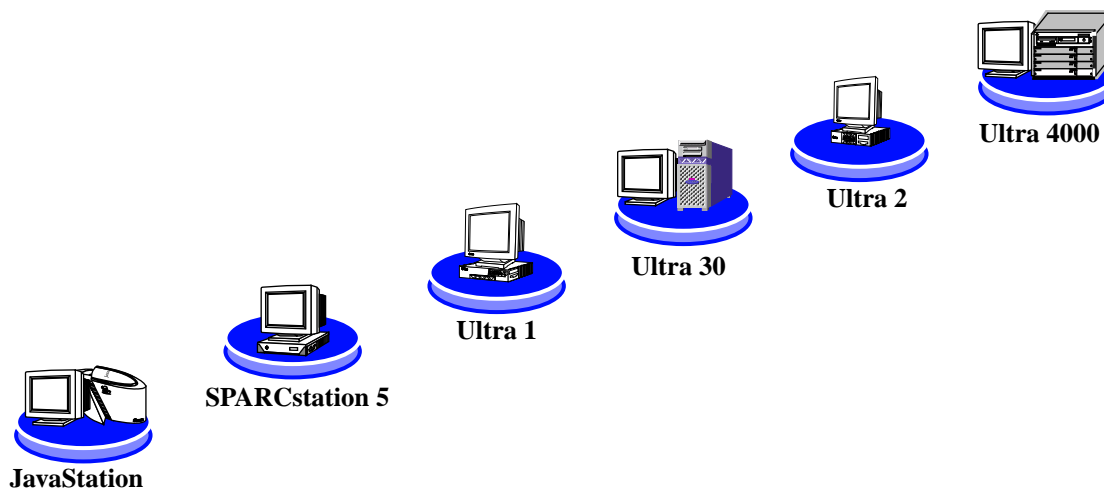- Price/performance leaders in their class

Figure 2. The Sun Desktop Family

Product Family Placement *(cont.)*

Workstation	Target Users and Markets
JavaStation	Target users for the JavaStation will initially be task-specific or low-diversity users in the corporate enterprise. Examples are bank tellers, call centers, data entry, kiosks, terminal emulation, or other applications where the computing resource will be used for a limited number of tasks. These task specific users are numerous and are spread across the following markets: financial, telecommunications, education, government, and manufacturing.
SPARCstation™ 5	Designed as a low-cost desktop solution, the SPARCstation 5 system appeals to customers looking for a low-priced system offering accelerated graphics, expandability, fast application performance, and investment protection. The SPARCstation 5 is well suited for many different customers, from those who require low-cost imaging solutions to those who demand intensive graphics and expansion capabilities. Target markets include software development, financial, government, telecommunications, manufacturing, and education.
Ultra 1	Aimed at traditional "power desktop" users. This includes both technical and commercial users who need the wide variety of applications and functional capabilities of the Solaris™ 2.x environment, the high-performance of the UltraSPARC-I processor, and the integration and support capabilities provided by the Sun™ channels. The additional features and performance of the Ultra 1 make it well suited for performance-intensive tasks and multimedia applications. Target markets include software development, MCAD/MCAE, electronic design, research and development, publishing and imaging, and financial.
Ultra 30	Aimed at high-performance computing and graphics markets. This includes both technical and commercial users who need the strong performance and expansion potential. The Ultra 30 offers more performance and greater expandability than the Ultra 1 workstation. In addition, it has the new PCI architecture rather than the SBus architecture of the Ultra 1 workstation.
Ultra 2	Designed for the technical user who requires high performance and multiprocessing (MP) capability. MP-ready and multithreaded applications will benefit greatly from the performance of the Sun Ultra 2 system. The target customer is the traditional "power desktop" user who has performance and expansion requirements that exceed the capabilities of the Ultra 1 system. This includes both technical and commercial users who need the large number of applications and the functional capabilities of the Solaris 2.5.1 environment, the high-performance of the UltraSPARC CPU, and the integration and support capabilities provided by the Sun channels.
Ultra 4000	Designed for the most demanding applications. It is for users who need a system with tremendous computing power—plus the ability to add capacity as needs grow. Ultra 4000 supports the most (14) CPUs, offers the most memory, and the most external disk capacity of any Sun workstation. The Ultra 4000 is recommended for oil and gas, animation and visualization applications, and real-time process-control industries.

Sun Ultra 30 Systems Positioning *(cont.)*

Key Messages

Sun Ultra 30 is the newest member of the UltraSPARC processor-based desktop systems. UltraComputing has evolved to new levels of performance and technology innovation.

- New innovative minitower system design provides modularity for flexibility, maximum system growth, and expansion potential
  - Easy to upgrade processor using the module design (same module and interchangeable with processor modules from Ultra 2 system)
  - Increased memory capacity to 2 GB maximum (16 slots using existing Ultra 16-, 32-, 64-, or 128-MB SIMMs)
  - Supports 2-, 4-, or 9-GB drive options (supports 1-inch or 1.6-inch height, 3.5-inch 7200-rpm UltraSCSI disk drives)
  - Two UPA graphics slots for dual accelerated Creator Graphics monitor support
  - Expanded front access capabilities: power switch, 5-inch removable media bay for options such as 12x CD-ROM or tape options. Optional front access floppy plus second 3.5-inch front access bay for options that can interface using the PCI slots such as PCMCIA adapters
  - High I/O expansion with four full-sized industry standard PCI bus slots
- New high-performance UltraSPARC-II CPU processor module
  - 64-bit SPARC™ version 9 at 250 MHz or 300 MHz
  - Provides 50 percent more of the raw processor computing power of the current Ultra 1 uniprocessor systems
  - 4X (2 MB) second-level cache memory of an Ultra 1 on Model 300 system
  - Full binary compatibility to existing software
  - Runs 32-bit applications unmodified from the Solaris 2.3 and Solaris 2.4 operating environments
- Fastest throughput in the industry
  - UPA provides a crossbar-oriented interconnection establishing a 144-bit wide, ECC-protected data path to the CPU
  - Clocked at 100 MHz, it gives a peak throughput of 1.6 GB per second
  - New memory subsystem offers dual, 288-bit-wide memory paths with an interleaving feature for improved system performance
  - Flexible architecture allows memory to be installed in pairs for 288-bit-wide memory path or in sets of four to utilize the dual 288-bit-wide memory path interleaving feature
  - New UltraSCSI Fast/Wide SCSI is integrated on the motherboard, offering double the disk performance (40 MB per second) of the current Ultra 1 or Ultra 2 systems

Sun Ultra 30 Systems Positioning *(cont.)*

Key Messages *(cont.)*

- Highest performance rating for networking, connectivity, and I/O performance in the industry
  - 100-Mbps Fast Ethernet through twisted pair is a standard feature in all Ultra 30 systems, but the system also maintains connectivity with 10-Mbps networking technology through an autosensing speed switch feature
  - Standard MII port connects to external transceivers, which provide connectivity to media other than the standard integrated 100/10BASE-T twisted pair
  - Advanced networking options include FDDI and additional Fast Ethernet ports through industry standard PCI option cards
  - New innovative multiple-channel industry standard PCI I/O bus provides sustained high throughput on all four full-sized PCI slots
  - Industry's first 66-MHz PCI I/O slot capable of delivering 200 MB per second throughput ideal for high-performance networking requirements
- New generation of Creator Graphics
  - Standard Creator Graphics technology is enhanced, with up to 50 percent graphics performance improvement, plus high-resolution support for new 24-inch wide-screen monitor (up to 1920 x 1200)
  - Creator integrated graphics provides comprehensive range of graphics functionality at low cost: 2-D, windowing, 24-bit true color graphics, and supporting both imaging and advanced 3-D graphics in one architecture
  - New dual-UPA graphics slots support up to two Creator Graphics accelerated monitors

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Sun Ultra 30 System Models

The Sun Ultra 30 comes in two models that differ only in the installed processor module. Model 250 is the entry Ultra 30 system. Model 300 is Sun's premier uniprocessor system, used in situations that require the highest computing and graphics performance.

Sun Ultra 30	Model 250	Model 300
Processor speed	248 MHz	296 MHz
UPA speed	83.3 MHz	100 MHz
SPECint_95*	10.0	12.1
SPECfp_95*	14.9	18.3

* SPECint_95 and SPECfp_95 results using SPARCompiler version ALPHA 5.0

Availability

- Sun Ultra 30 Model 250, Creator and Creator3D, currently available
- Sun Ultra 30 Model 300, Creator and Creator3D, currently available

Target Users

Sun Ultra 30 systems are aimed at high-performance computing and graphics markets. This includes both technical and commercial users who need the strong performance and expansion potential offered by the Ultra 30. Entry-level Ultra performance continues to be available with the Ultra 1 Model 170E and 200E systems. For Ultra multiprocessing requirements, the Ultra 2 system should be considered.

Ultra 30 Positioning *(cont.)*

Target Markets

The market opportunities for the Sun Ultra 30 are technical and commercial areas in which high-performance computing and graphics are required. Ultra 30 systems position above the current Ultra 1 markets (shown below for overall product line positioning).

Industry	Key Features to Highlight	Ultra 1	Ultra 30 Model 250	Ultra 30 Model 300
Software Development (CASE) – ISVs – In-house development at large organizations	• High-performance Solaris environment • Availability of applications	✓	✓	
Mechanical Design (MCAD/MCAE) – Automotive – Aerospace – Defense industry – Mechanical equipment designers	• High-performance CPU • High-end graphics performance and functionality standard • Availability of applications	✓	✓	✓
Electronic Design (EDA) – Chip designers, board designers – System houses – Telco	• High-performance CPU • High-memory capacity • Availability of applications		✓	✓
Research and Development – In-house development – Research institutions	• High-computing performance • Feature-rich Solaris environment	✓	✓	
Publishing and Imaging – Newspapers – Magazines – Image banks – Advertising agencies	• High-performance CPU • High-end performance and functionality for both graphics and imaging operations • Dual Creator Graphics monitors		✓	✓
Visualization and Simulation – Scientific visualization – Technical simulation	• High-performance CPU • High-end performance and functionality for both graphics and imaging operations • Dual Creator Graphics monitors			✓
Oil and Gas – Visualization – Graphic modeling	• High-performance CPU • High-end performance and functionality for both graphics and imaging operations • Dual Creator Graphics monitors			✓
Financial – Stock and commodity traders – Banks	• High performance • Compact design • Multimedia capabilities	✓	✓	

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Selling Highlights

Partners and Key Applications

Sun has worked closely with major software vendors to ensure that their applications are tested and will be available and officially supported very soon after the Sun Ultra™ 30 systems are available. All major applications that are available can be found in our Catalyst℠ catalog of third-party solutions.

Target Market	ISV— Software Applications	
Entertainment/ Animation/ Digital Creation	Adobe ArSciMed	Photoshop Kinema/Sim Kinetix (Lightwork's rendering tool kit) (www.lightwork.com)
EDA	Avant!/ISS Avant!/Meta Software Cadence Design Compass Design K2 Technologies Mentor Graphics Mentor/Precedence Silvaco SpeedSim Systems Science Viewlogic/Vantage Analysis Simplex Silvaco	DRC/ERC product HSpice Vampire Dracula Pathfinder Mask Compose and QuickView Caliber ICVerify Checkmate Co-Simulation Backplane Simulators Atlas Athena (FCS mid 1997) Spice (FCS Q3CY97) SpeedSim Vera SpeedWave MT Thunder and Lightning Fire and Ice Virtual Wafer Fab Automation Tools

	For general information see:
	  http://www.sun.com/desktop
	  http://www.dacafe.com:80/DACafe/CORPORATE/corpeda.html	

Health care	Cemax Context Vision ISG Virtual Vision Software	VIP 2.0 (www.cemax-icon.com) Imaging processing for refining MR data Silohet (www.isgtec.com)

Key Applications *(cont.)*

Target Market	ISV— Software Applications	
MCAE	ANSYS, Inc.	ANSYS
	Computational Dynamics, Inc.	StarCD
	ESI	Pam-Crash
	EXA Corporation	Powerflow
	Fluent, Inc.	Fluent/Fluent UNS/Rampant
	Fluid Dynamics, Inc. (FDI)	FIDAP
	Hibbitt, Karlsson & Sorensen, Inc. (HKS)	ABAQUS
	Livermore Software Technology Corporation (LSTC)	LSDyna 3D
	MacNeal-Schwendler (MSC)	PATRAN/NASTRAN
	MARC Analysis Research Corp	Mentat/MARC
	For general information see: `http://www.sun.com/desktop` `http://roark.corp`	
MCAD	Computervision	Computervision
	Dassault	Catia
	EDS/ Unigraphics	Unigraphics
	Parametric Technologies	Pro Engineer
	SDRC	I-Deas Master Series
Oil and gas	Cognesis	
	GeoQuest	Charisma
	Landmark Graphics	ProMax and Seisworks

Compatibility

The Ultra 30 runs the Solaris™ operating system (version 2.5.1 hardware: 4/97). As a result, it can run 32-bit applications unmodified from the Solaris 2.3 and Solaris 2.4 OS; therefore these new systems are totally compatible with previous systems and software.

Market Value Propositions

• As a result of the scalability and flexibility of the UltraSPARC™ architecture, a company can better protect its investment in hardware and software.

• As a result of Sun's memory and UPA, a company will notice the significant improvement in application performance and user productivity.

• As a result of our I/O networking, a company will be able to have faster networking throughput which will increase application performance and user productivity.

New UltraSPARC™ -II Processor

The Ultra™ 30 is a shared-memory, multitasking system built around the new UltraSPARC-II microprocessor. The UltraSPARC-II is Sun's latest generation of the SPARC™ family and the second generation of 64-bit UltraSPARC chips. The UltraSPARC-II processors have clock rates of 250 MHz and 300 MHz.

- Modules have the 64-bit SPARC V9 architecture.
- Systems can have 2-MB of Ecache per CPU (Model 300)—4X the cache size of Ultra 1.
- As a member of the UltraSPARC family of CPUs, full binary compatibility is assured.

New PCI Technology

System I/O for the Ultra 30 is provided by two industry-standard Peripheral Component Interconnect (PCI) data buses. All PCI buses in the Ultra 30 comply with the 2.1 revision of the PCI specification, released in March 1995.

- Sun leads the industry with PCI/66, which has two times the throughput of standard PCI.
- Two independent PCI buses deliver unparalleled I/O bandwidth—up to 200 MB per second sustained throughput.

Creator Graphics, Series 2

Creator leads the way, integrating high-performance graphics with Sun's new UltraSPARC-II processors. For accelerated imaging, Creator is combined with the Visual Instruction Set (VIS™), the most comprehensive set of imaging and graphics instructions ever built into a CPU. The result is that Creator is very fast and very cost effective.

Ultra Creator Graphics, Series 2 is the next generation of the Creator Graphics accelerator. It provides fast, high-quality transformation and display of 3-D solid and wireframe objects. It also accelerates 2-D objects that meet the X11 rules.

In addition, Creator now supports 24-inch wide-screen monitors.

Enabling Technology

Technology Overview—More Than Just a Fast Chip

Good performance through advanced applications typically demands excellent performance from more than one part of the system. Most often, an application consists of data fetching, computation, and presentation. Unless the system is designed to address all of these, it will always be limited by the weakest link in the chain.

The Sun™ Ultra™ 30 workstation is designed for balanced system performance, accelerating applications at every step. Faster I/O and networking, together with the UPA interconnect, allow fast data fetching. The UltraSPARC™ CPU provides supercomputing power, and moves data through the UPA at high speed. Tightly integrated Creator Graphics provides high-end graphics functionality and performance for the Ultra 30 Creator systems.
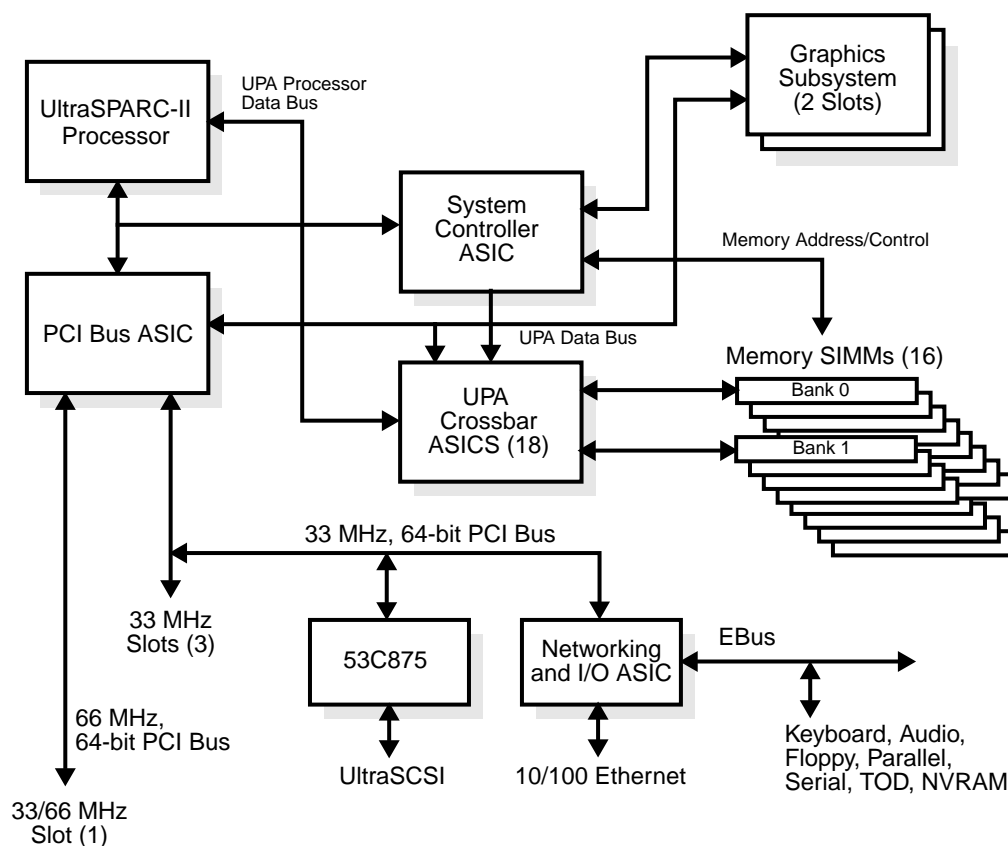
Figure 1. Architecture of the Ultra 30 systems

The Sun Ultra 30 system has the Ultra Port Architecture (UPA). This architecture is a packet-switched, cross-bar architecture and Sun is the first to provide such an architecture on the desktop. The Sun Ultra 30 has 18 buffered cross-bar switched chips that allow the memory and the graphics to interconnect. This architecture is the basis for the sensational compute and graphics performance.

Key Facts

- Extraordinary performance desktop system using the UltraSPARC-II processor
- High-end graphics functionality and performance at entry-level prices with Creator Graphics
- Balanced system design
  - Matching performance enhancement in I/O, networking, and memory access
  - Application performance without compromise

Technical Fact Summary

- New higher-performance system bus
  - Fast access to memory and graphics
- Easy disk expandability
  - Up to two internal UltraSCSI disks; either 2.1-, 4.2-, or 9.1-GB disks
  - Up to 109.2 GB of total disk storage
- High-performance memory subsystem
  - Up to 2 GB using 16 x 128-MB SIMMs, installed in pairs
  - Supports Ultra 1, Ultra 2, and SPARCstation™ 20 SIMMs for compatibility and investment protection
  - 700 MB per second peak bandwidth
- High-performance I/O
  - 40 MB per second UltraSCSI
  - Innovative high-performance PCI I/O bus offering dual independent PCI buses, plus 66 MHz PCI capability
- Designed for interactive media applications
  - Integrated Visual Instruction Set (VIS™) in the UltraSPARC CPU
  - Advanced 24-bit accelerated Creator Graphics standard
  - 12x CD-ROM, photo-CD compatible
- Expansion to advanced networking
  - Fast Ethernet, 100BASE-T, auto-sensing, and autoswitching to 10BASE-T for backward compatibility
  - MII connector to Fast Ethernet for connection to other types of Ethernet transceivers and media
  - PCI networking options include Gigabit Ethernet, ATM, Token Ring, and FDDI to name a few
- New system enclosure
  - Cost-effective minitower enclosure offering strong expansion

System Architecture

UltraSPARC™ Processor

The Ultra 30 is a high-performance, uniprocessing system built around the UltraSPARC-II microprocessor. The UltraSPARC-II is Sun's latest generation of the SPARC family and the second generation of 64-bit UltraSPARC chips. It utilizes the latest 0.35-micron technology (versus UltraSPARC-I CPU's 0.5-micron technology), which shrinks the die size to 149^2mm (from 218^2 mm). This reduced die size is the key to UltraSPARC-II CPU's higher clock rates and increased performance. This smaller die size also enables the UltraSPARC-II to operate at a core voltage of 2.5 volts, rather than UltraSPARC-I CPU's 3.3 volts. This lower voltage reduces power consumption and allows the chip to operate at higher frequencies without increasing total power requirements or heat dissipation—both major design issues in today's high performance systems.

UltraSPARC-II processors used in the Ultra 30 are individually mounted on 4-inch x 6-inch, field-installable module cards along with associated UPA data buffers and 2 MB of high-speed SRAM external cache memory (2 MB on Model 300, 1 MB on Model 250). These modules are the same as those used in the Ultra 2 workstation. This modular design facilitates easy system processor upgrades (to next generation UltraSPARC processors), and system service.

- **Features**
  - Integrated VIS instruction set

  - Multilevel trap handling
  - Utilizes the latest 0.35 micron technology which greatly decreases the die size

  - CPU is mounted on field-installable module card with associated UPA data buffers and 1- or 2-MB of Ecache

- **Benefits**
  - Ready for increased performance on multimedia and networking operations
  - Efficient process handling
  - Results in a significant increase performance and a significant decrease in power consumption (due to a lower core voltage of 2.5 volts)
  - Facilitates easy system processor upgrades and system service

UPA System Bus

The Ultra 30 processors, memory, and I/O subsystems are interconnected by the high-speed Ultra Port Architecture (UPA) crossbar datapath. This is an enhanced implementation of the same UPA design used in the Ultra1 and Ultra 2. The CPU datapath is 144-bits wide, with 128 bits for data and 16 bits for error correcting code (ECC). The UPA data path that support system I/O is72-bits wide, with 64 bits for data and 8 bits for ECC. The memory interface supports dual 288-bit wide datapaths.

With 250-MHz CPU installed (Model 250), the UPA clocks at 83.3 MHz, and with 300-MHz CPU installed (Model 300), the UPA transfers data at 100 MHz, or one transfer every 10 nanoseconds. CPU segments, which transfer 16 bytes of data in parallel each clock cycle, each have a maximum transfer rate of 1.6-GB per second.*)*

- **Feature**
  - Dual 288-bit wide, high-speed memory bus

- **Benefit**
  - High-performance memory access
  - Flexibility in memory expansion options

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Memory

The Ultra 30 supports up to 2 GB of 60-ns, 5-volt, dynamic RAM memory. Double in-line memory modules (DIMMs) used by the Ultra 30 are the same type as those used in the Ultra 1 and Ultra 2 workstations. Memory is organized into four banks of four DIMMs. To utilize the Ultra 30 memory interleaving feature for best system performance, memory DIMMs should be installed in sets of 4 of identical DIMMs. However, the Ultra 30 will also accept DIMMs installed in paris. This memory interleaving feature allows flexibility in memory expansion options.

- **Features**
  - Uses the same type of memory as Ultra 1 and Ultra 2
  - With two banks of DIMMs installed, (memory installed in sets of 4) memory operations can be two-way interleaved

- **Benefits**
  - Protects customer's investment and enhances upgradability
  - Reduces the average latency for reads and writes almost in half, and nearly doubles the memory throughput over non-interleaved operations

System Architecture *(cont.)*

System I/O—High-Performance PCI Technology

System I/O for the Ultra 30 is provided by two industry-standard Peripheral Component Interconnect (PCI) data buses. All PCI buses in the Ultra 30 comply with the 2.1 revision of the PCI specification, released in March 1995.

- PCI slot 1 operates at 33- or 66-MHz and supports either a 32-bit or 64-bit, 3.3 volt or universal PCI card on an independent bus.
- PCI slots 2-4 operate at 33-MHz and provide for 32- or 64-bit, 5 volt or universal PCI cards.

Slots	Slot Width, Clock Rate	Card Input Voltages Supported
1	32 or 64 bits, 33 or 66 MHz	3.3 volt or universal
2-4	32 bits, 33 MHz 64 bits, 33 MHz	5 volt or universal

In addition to the I/O capabilities available through PCI option cards, the Ultra 30 provides the following I/O channels directly from the main system board:

- One internal/external 40-MB UltraSCSI channel with external 68-pin SCSI connector
- One external 10/100 auto-select Ethernet port (supports either a Cat-5 UTP, RJ45 connector, or 40-pin miniature "D" MII connection)
- Two external EIA-232D or EIA-423 serial ports via two DB25 connectors (support EIA-423 synchronous data rates from 50 baud to 384 Kbps, and asynchronous data rates from 50 baud to 460.8 Kbaud)
- One external 2-MB Centronics-compatible, bidirectional, EPP parallel port with one DB25 connector
- One external standard Sun Keyboard/Mouse port (mini DIN-8 connector)

- **Features**
  - Industry's first 66-MHz PCI with 200-MB per second bandwidth (sustained)
  - Two independent buses

- **Benefits**
  - Highest performance I/O throughput
  - Access to many third-party solutions
  - High, sustained I/O throughput

System Architecture

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Storage

Internal data storage for the Ultra 30 is provided by up to two 3.5-inch by 1-inch or 3.5-inch by 1.6-inch UltraSCSI disk drives. Drive sizes include 2.1-, 4.2-, and 9.1-GB UltraSCSI drives. These 7200-rpm drives offer a peak data transfer rate of 40-MB per second—twice the transfer rate of Fast/Wide SCSI controllers.

In addition to its internal and external high-speed fixed storage capabilities, the Ultra 30 provides an optional 12 x CD-ROM drive and a 1.44-MB 3.5-inch manual eject floppy drive for software installation and system management.

- **Feature**
  - 40-MB/sec. UltraSCSI
  - 2.1-, 4.2-, and 9.1-GB disk options

- **Benefit**
  - Fast access and retrieval of mass storage data
  - Flexibility in internal disk expansion and high internal capacity

The Ultra 30 minitower accommodates front-access peripheral expansion through one 1.6-inch drive half-height 5.25-inch bay, and two 3.5-inch bays for a diskette drive, PCMCIA adaptor, or other options.
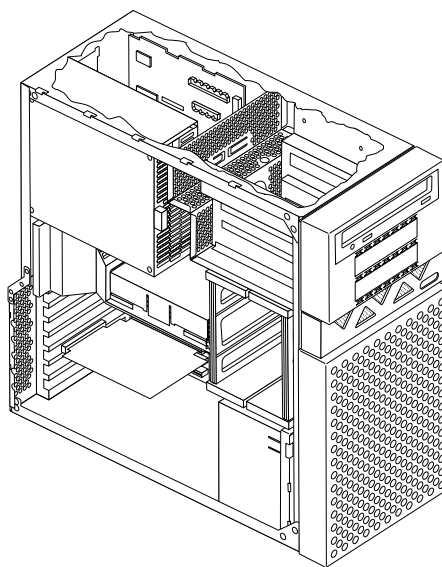

Figure 2. Ultra 30 chassis with access panel removed, provides full access to internal options

System Architecture

Creator Graphics, Series 2 Overview

Ultra Creator Graphics, series 2 is the next generation of the Creator Graphics accelerator. It provides fast, high-quality transformation and display of 3-D solid and wireframe objects. It also accelerates 2-D objects that meet the X11 rules.

Series 2 is designed to match or exceed the CPU performance increase to 300 MHz and beyond. The original generation of Creator Graphics has a single graphics/frame buffer clock for logic that runs at 67 MHz. This new generation has one clock for the internal graphics processing and another clock for the frame buffer enabling each part to run at maximum speed independently from each other.

Creator Graphics is available in two configurations: single-buffered for hardware acceleration of 2-D graphics (known as Creator Graphics), and double-buffered for increased 3-D graphics performance (known as Creator3D Graphics).

- **Features**
    - Creator functionality standard
    - True color as standard
    - Superset of earlier available functionality
    - Soalris™ OpenGL™ 1.1, the industry-standard 3-D graphics library, is available and fully supported and optimized for Creator Graphics architecture

- **Benefits**
    - Unprecedented performance and functionality
    - 8-bit overlay plane for compatibility
    - Unprecedented performance and functionality

High Performance

Creator Graphics performance is based on a unique system-level approach to designing graphics.

- UltraSPARC CPU
    - Creator Graphics relies on the power of the UltraSPARC CPU for floating-point calculations, and on the VIS Instruction Set to accelerate imaging. This eliminates the need for a dedicated graphics processor, and results in a significant cost advantage with Creator Graphics.
- UPA Graphics Interconnect
    - UPA provides a high-speed, high-bandwidth interconnect between the CPU, Creator Graphics, and system memory. It raises overall graphics performance while maintaining a balanced throughput. Unlike the peripheral SBus, UPA interconnect ties Creator Graphics directly to the CPU and memory, and delivers orders of magnitude greater bandwidth.
- Creator Rendering ASIC
    - A new ASIC renders graphics primitives at very high speeds. The Creator ASIC accelerates fills, scroll, text, lines, and polygon rendering.
- 3D-RAM graphics memory
    - A breakthrough in graphics memory provides high bandwidth and built-in acceleration for 3-D graphics.

Creator Graphics, Series 2 Overview *(cont.)*

What's New with Series 2?

Creator, Series 2 has evolved from the initial generation of Creator Graphics and, therefore, shares many of the characteristics of the original Creator and Creator3D series and remains 100 percent compatible with previous generation Creator Graphics. The new features provided by Creator Graphics on both the single-buffered and double-buffered cards are:

- Faster video decompression by on-board YCC to RGB color space conversion

- Imaging and windowing support, including contrast stretch and consecutive block prefetch for reads

- Increased video and monitor support
  - Line doubling for interlace video writes
  - DDC2B monitor serial communication, with EDID default resolution support in the graphics board bootprom
  - Provides a utility to change the resolution within the upper and lower limits of what the board can support

For the double-buffered, Creator3D option, these additional features are new:

- Single-buffered, high-resolution (2.3 M pixels) support:
  - 1920 x 1200 landscape mode (enhanced HDTV-style)
- Buffer B addressing for stateless and video accesses

Creator Graphics Models

Creator Graphics is offered in two models: Creator and Creator3D. These models are two physically different boards. A Creator board cannot be upgraded to a Creator3D board by adding more 3D-RAM memory. An upgrade is done by changing the graphics board.

Creator	Creator3D
• Limited 3-D acceleration • Suited for 2-D, windowing, and imaging applications including: CASE, EDA, medical imaging, and general research • 24-bit true color single-buffered • 8-bit overlay and visual planes • Stereo display up to 960 x 680 at 112 Hz noninterlaced • 5-MB 3D-RAM memory • 1280 x 1024 at 76 Hz standard with programmable bootprom resolution • 64-bit DAC • High resolution (1280 x 1024 at 76 Hz non-interlaced)	• Full 3-D acceleration • Ideal for 3-D graphics and solids in MCAD and MCAE, as well as high-end imaging applications • 2 x 24-bit true color double buffering • 8-bit overlay and visual planes • 28-bit Z-buffer • Stereo display up to 960 x 680 at 112 Hz noninterlaced, double- and Z-buffered • 15-MB 3D-RAM memory • 1280 x 1024 at 76 Hz standard with programmable bootprom resolution • 128-bit DAC • Single-buffered, high-resolution monitor support (1920 x 1200 with Sun 24-inch, wide-screen monitors)

Creator Graphics Software Interfaces

Creator Graphics systems support all Solaris™ 2.5.1 graphics and window system APIs, including OpenGL™, XGL™, XIL™, and Display PostScript™. A large number of Sun and third-party graphics APIs are also supported, including IRIS GL, OpenGL, GKS, HOOPS, and PHIGS. Industry-standard X-extension libraries, such as Xlib and PEXlib, are available and are accelerated via the XGL and XIL foundation graphics libraries.
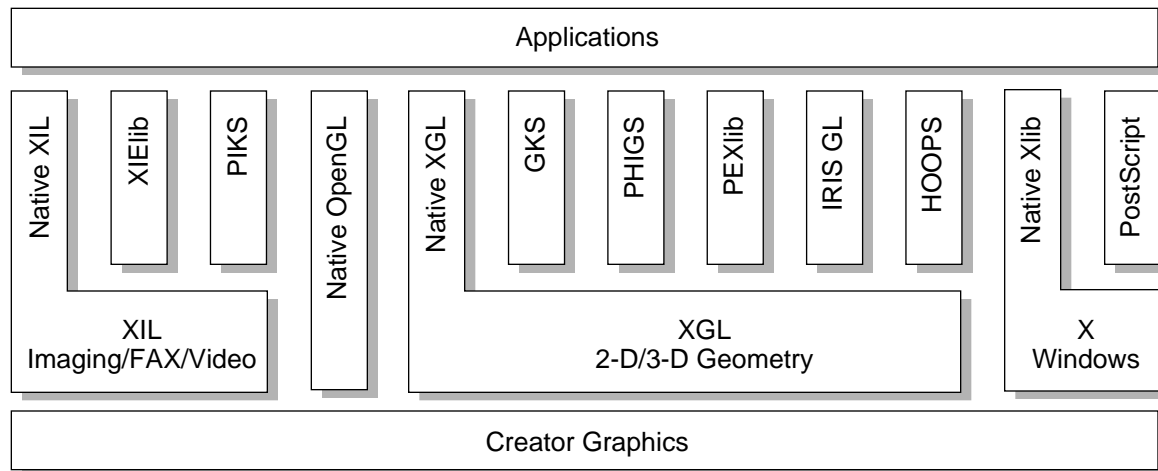
Figure 3. Platforms Supported by Creator Graphics

Because Creator Graphics platforms provide windowing, imaging, and geometry acceleration, they enhance the performance of all of the APIs mentioned above.

System Architecture

Sun Ultra 30 Graphics Performance

	Ultra 30
Xmark	30.2
2-D vectors per second	4,060,000
3-D Performance • 3-D vectors/second • 3-D mesh/second • 3-D quads/second	(Creator3D) 3690000 1337000 453000
GPC PLB • PLBwire93 • PLBsurf93	 225.0 317.1
OpenGL™ • CDRS-03 • DX-03	(Creator 3D) 52.3 9.6
Imaging Performance • Fill • Pan/copy • Convolve (3x3)	 835/71 165/61 40/5
Color monitors supported	17, 20, and 24 inches

Metrics defined:

- 2-D vectors are 10 pixels long, X11 perf numbers

- 3-D vectors are 10 pixels long, depth-cued, clip tested, perspective projection, solid line through XGL

- 3-D mesh are 25 pixel triangle mesh, one light source

- 3-D quads are 100 pixel, independent quadrilaterals, with one directional light source

- Both 3-D mesh and quads are Gouraud shaded, randomly oriented, transformed, clip tested, with perspective projection and Z-buffered through XGL.

- Configuration with 24-inch monitor use Creator3D in single buffer mode unless otherwise noted

- 3-D quads are 100-pixel 3-D quads, one light—ambient, diffuse, isolated, perspective, Gouraud shaded, Z-buffered with culling (in thousands)

- XIL numbers are in million pixels (megapixels per second) for a single-band image

Special features

- Accelerated imaging and advanced 3-D graphics with Gouraud shading, line antialiasing, per-pixel depth cueing, subpixel addressing, transparency, stereo viewing with monitor

System Architecture

Sun Ultra 30 System Configuration

	Sun Ultra 30 Model 250	Sun Ultra 30 Model 300
Dimensions and weight	45 cm x 19 cm x 49.8 cm (H x W x D) 17.7 inches x 7.5 inches x 19.6 inches 17.6 kb (38.8 pounds)	
CPU and UPA – Architecture – Clock rate – Processor slots – Cache on chip – External cache – UPA speed	UltraSPARC-II 248 MHz 1 32 KB 1 MB 83.3 MHz	UltraSPARC-II 296 MHz 1 32 KB 2 MB 100 MHz
Memory – Memory type – Number of slots – Capacity – DRAM speed – Bus width – DIMM sizes	ECC 16 128 MB to 2 GB 60 ns 288 bits (dual paths) 32, 64, and 128 MB	
Storage – Maximum internal – Maximum total	Two internal disk capacity, up to 18.2 GB 109.2 GB	
I/O Interfaces – UltraSCSI – Graphics – Serial ports – Parallel port – PCI I/O bus	40 MB/sec. UltraSCSI (SCSI-3) Two UPA graphics slots support Creator and Creator3D Two RS-232C/RS423 DB25 Centronics compatible (DB25) Four full-size PCI slots (version 2.1): Three at 33 MHz; one at 33 or 66 MHz	
Networking ports	TP Ethernet 100/10BASE-T or MII port	
Backup and distribution – Floppy – CD-ROM – Internal – External	Optional 3.5-inch floppy SunCD™ 644 MB, SunCD 12x Optional 12–24 GB DDS2 4mm, 14 GB 8mm, up to two 2.1-, 4.2-, or 9.1-GB disk 2.1–9.2 GB SPARCstorage™ UniPack 8.4–54.6 GB SPARCstorage MultiPack 2.5-GB QIC 20– 40 GB, 8mm 4–8 GB, 4mm DDS-2 12–24 GB, 4mm DDS-3 72–144 GB, 4mm DDS-3 autoloader 140-GB SPARCstorage Library Model 8/140 20–40 GB DLT4000 35–70 GB DLT7000	

System Architecture

Sun microsystems

Sun Ultra 30 System Configuration *(cont.)*

Product Highlights	Sun Ultra 30 Models 250 and 300 Creator	Sun Ultra 30 Models 250 and 300 Creator 3D
Operating system	Solaris 2.5.1 hardware: 4/97	Solaris 2.5.1 hardware: 4/97
Monitors – 20-inch color	1280 x 1024 at 76 Hz 1152 x 900 at 76 Hz and other programmable resolutions	1280 x 1024 at 76 Hz 1152 x 900 at 76 Hz and other programmable resolutions
– 24-inch wide-screen color	N/A	High-resolution support: 1920 x 1200 at 70 Hz* 1600 x 1000 at 76 or 66 Hz* 1440 x 900 at 76 Hz* 1280 x 800 at 76 Hz
Graphics – Graphics	Creator	Creator3D
– Color planes and visual capabilities	NTSC/PAL 24-bit plus 8-bit overlay Stereo (960 x 680) at 112 Hz	NTSC/PAL 24-bit plus 8-bit overlay Stereo (960 x 680) at 112 Hz
– Double buffer	8-bit	24-bit
– Z-buffer	—	28-bit
– Multimedia features	24-bit true color accelerated video playback	24-bit true color accelerated video playback
Graphics market positioning – Windowing and 2-D	✔	✔
– 3-D wireframe	✔	✔
– 24-bit and imaging	✔	✔
– 3-D solids		✔
– Multimedia	✔	✔
✔= Primary Application * = Creator3D in single buffer mode		

System Architecture

Licensing and Usage

All Sun™ system and system-board products include a Solaris license. The type of Solaris license(s) shipped with each platform reflects the way in which that system is most commonly used. Additional Solaris licenses are available to allow increased usage of the software.

Ultra 30 workstations come with a Solaris Desktop License. The Solaris Desktop License is a limited license. It does not provide several of the services provided by the Solaris Server License, such as:

- Allowing more than two users to be directly connected
- Providing database or compute services for more than two continuous users
- Providing swap disk space for any other system
- Providing home directly space for any other system

If a system that is shipped with a Solaris Desktop License will be used as a server (requires services listed above), the system must be upgraded to a Solaris Server license.

System Architecture

System Administration

ShowMe™ How™: State of the Art Installation and Maintenance Instruction

ShowMe™ How™ is a new documentation system that presents information in a highly understandable multimedia format. Installation and service tutorials as well as reference information provide users with comprehensive, easy to use instruction. ShowMe How streamlines installation and maintenance to lower service costs and maximize system uptime.

- **Features**
  - Distributed on CD-ROM

  - Movies of installation and replacement procedures played through ShowMe™ TV™ software packaged with application
  - Photo sequences with narrated installation and replacement procedures
  - Text-based instructions can be viewed on-line and printed, excerpted from standard Sun documentation
  - Photos with active callouts link to more detailed photos and text-based reference information

- **Benefits**
  - Included with every system

  - Make installation maintenance easy and lower maintenance costs

SunVTS™

The SunVTS™ system exerciser is a graphically-oriented UNIX® application that permits the continuous exercising of system resources and internal and external peripheral equipment. Used to determine if the system is functioning properly, SunVTS incorporates a multifunctional stress test of the system through operating system level calls, and allows the addition of new tests as they become available.

System Management

Sun
microsystems

Solaris™ OpenGL™ 1.1 Ultra Creator Edition

OpenGL is the standard software interface for graphics hardware that allows programmers to create interactive 3-D applications. OpenGL provides an easy-to-use, full-featured, network-transparent application programming interface (API) for developing applications that use 3-D graphics.

Solaris™ OpenGL™ 1.1 is targeted at developers creating interactive 3-D applications for the enterprise, the intranet, and the Internet. These developers are affiliated with ISVs or VEUs in technical markets or in research labs. Potential users include those in computer-aided design and manufacturing, global information systems, simulation, industrial design and modeling, entertainment, biochemistry, and petroleum exploration market segments.

Solaris OpenGL 1.1 is a functionally conforming implementation based upon the OpenGL 1.1, GLX 1.2, and GLU 1.2 API specified by the OpenGL Architecture Review Board (ARB). Solaris OpenGL 1.1 is available on Ultra Creator and Ultra Creator3D platforms, where the OpenGL functionality is accelerated in hardware. In addition, Solaris OpenGL 1.1 is available on all the legacy SPARCstations™ equipped with SX, ZX, GX, GXplus, TurboGX™, TurboGXplus™, S24™, TCX or FSV frame buffers, which is made possible through an optimized software rendering pipeline.

Note: Solaris OpenGL 1.0 only supported Creator3D.

OpenGL Features and Benefits

Solaris OpenGL 1.1 provides significantly improved performance, making Sun™ platforms an attractive choice for ISVs to port their applications to:

- **Features**
    - A single, industry-standard 3-D graphics API which runs across all major graphics hardware and operating systems (e.g. Solaris, other UNIX, and Microsoft platforms)

    - Existing OpenGL applications easily portable to Ultra Creator3D systems

    - Conforms to OpenGL Architecture Review Board (ARB) OpenGL 1.1 specification

- **Benefits**
    - Developers can now work with a single source code pool for multiplatform 3-D graphics applications, gaining the benefits of:
    - Reduced support costs
    - Reduced application tuning work
    - Enables Sun platforms to attract mainstream applications in the Oil and Gas, Visualization, Simulation, and Animation industries
    - Gives customers a broader range of applications to from which to choose
    - Enhanced 3-D application portability and interoperability among OpenGL implementations from different vendors

System Management

Sun microsystems

Solaris OpenGL 1.1 Ultra Creator Edition *(cont.)*

OpenGL Competition

- Silicon Graphics, IBM, and DEC all have native implementations of OpenGL in their graphics systems product lines. HP uses a third-party solution but will have a native implementation in the near future.

- Evans and Sutherland provides OpenGL for the Freedom Series of graphic system accelerators for their OEM partners, including HP, IBM, DEC, and Sun.

- Template Graphics Software (TGS) provides software-only implementations of OpenGL for Solaris, Apple Macintosh, and HP-UX. TGS also provides accelerated versions of OpenGL for Sun's ZX and TurboZX™.

- Portable Graphics, an Evans and Sutherland subsidiary, provides software-only implementations for HP and Linux.

- Microsoft has bundled OpenGL with Microsoft Windows 95 and Microsoft Windows NT.

OpenGL Tech Facts

- OpenGL 1.1 system requirements:

  - Platforms: Creator3D, Creator, ZX, GX, TCX, SX product families
  - Operating system: Solaris 2.5.1, with Maintenance Update 3 patch or Solaris 2.6 or higher
  - Window system: CDE, OpenWindows™
  - Disk space:
    - For end-user runtimes: 17.34 MB
    - For developers: 17.52 MB (runtime binaries and header files)
                               10.7 MB (documents and examples)
  - Memory: 64 MB minimum
                           128 MB or higher recommended for major applications
  - Other: Network Interface
                           Routers
                           Media

System Management

Solaris 2.5.1 Operating System

The Sun™ Ultra™ 30 system is supported by the industry's leading enterprise operating system, Solaris 2.5.1. Built on the latest UNIX technology, the Solaris environment delivers unparalleled scalability and performance. With enterprise integration by design, Solaris provides easy access to a wide range of computing environments and network technologies. Solaris delivers a competitive advantage to businesses through networked computing, scalability, and multi-architecture support. Solaris provides an advanced, superior solution for all customer IT needs, both technical and business. Solaris is an industrial-grade solution with the performance, quality, and robustness to deliver mission-critical reliability.

For technical desktop users, Solaris delivers unique advantages. Its advanced features and functionality, combined with built-in networking, gives users a high-performance computing environment, enabling faster and higher-quality work. For graphics and performance-intensive computing such as design automation, finance, and data visualization, Solaris provides the power, performance, and innovation that businesses need to be competitive.

Solaris 2.5.1 delivers the power of the Sun Ultra 30 systems, with benefits that include enhanced networking capabilities and performance, graphics and imaging, increased standards compliance, and key operating system performance advancements.

Solaris 2.5.1 Hardware: 4/97 is the required Solaris operating system version supporting Sun Ultra 30 systems. Solaris optimizes the UltraSPARC™ processor, and provides a reliable and stable platform for mission-critical applications.

What's New in Solaris 2.5.1 Hardware: 4/97 for Ultra 30

- New features specific to Ultra 30
  - UltraSCSI disk support
  - Creator Graphics series 2, high-resolution modes for 24-inch wide-screen color monitor

Solaris 2.5.1 Feature Summary

- Solaris 2.5.1 offers
  - Optimized support for *Sun4u* architecture, utilizing the UltraSPARC processor's extra floating-point registers, Visual Instruction Set (VIS™), accelerated *bcopy* and *bzero* functions, and separate kernel and user address spaces
  - Improvements to the virtual memory system and kernel memory allocation to decrease system memory requirements and boost large system performance
  - Faster pipes and standard I/O to increase application I/O performance
  - NFS™ version 3, for faster network file writes and directory reads; reduces server loading
  - NFS over TCP, for better performance over wide-area networks
  - Improved network file locking (*lockd*), for faster and more reliable distributed file locking
  - Name Service Cache (NSC) providing very fast name service lookups, and increasing access to directory, mail, and http

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Solaris 2.5.1 Operating System *(cont.)*

Solaris 2.5.1 Feature Summary *(cont.)*

- Improved Solaris 1 compatibility
  - Support for Solaris 1 binaries that utilize a mixture of static and dynamically linked libraries
  - Additional Solaris 1 commands and library interfaces
- Improved security
  - Access control lists and NIS+ password aging
- Increased standards support
  - Posix threads (1003.1c) support
  - Full X/Open® xpg4/xcu4 branding
  - X/Open XFN federated naming, allowing two or more naming services to cooperate
  - Kodak Color Management System™
  - CDE 1.0.2, Wabi™ 2.2, and ODBC copackaged
- The Solaris environment connects users to the enterprise.
  - Provides connectivity to and/or integration with other enterprise resources
  - Supports the applications, tools, and services to retrieve, process, and manage information
  - Provides a user interface to present information; facilitates communication through a graphical user interface (GUI) and graphics, imaging, and other technology

Solaris Features and Benefits

- **Features**
  - Solaris 2.5.1 operating environment
  - Multithreaded operating environment
  - Over 5000 native Solaris 2 applications
  - Compatible with Solaris 1

  - Graphics: Foundation-layer libraries

  - Common Desktop Environment (CDE)

  - Networking: Multinetworking integration

  - Wabi 2.2

  - Object technology

- **Benefits**
  - Industry-leading enterprise operating system
  - High performance and scalability
  - Wide range of tuned and tested applications
  - Backward-compatible to thousands of additional Solaris 1.x applications
  - Compatible with feature-rich and industry-standard graphics libraries
  - Industry-standard, multivendor graphical user interface
  - Transparent access to PC and enterprise networking resources
  - Access to the most popular PC applications and application suites
  - Supports OMG/CORBA-compliant Solaris NEO™ object environment

System Management

Sun™ Ultra™ 30 Ordering Information

The Sun™ Ultra™ systems use a new marketing part number scheme that is designed to provide greater flexibility and expandability. This page explains how to read the new part numbering scheme. "N" means "Not available" or "Not applicable."

A11-AAA1-1A-111AAC

- System
- Microprocessor family
- Microprocessor speed
- Ecache Size
- Number of Microprocessors
- Monitor
- Frame Buffer
- Memory
- Disk
- "Non-standard" System
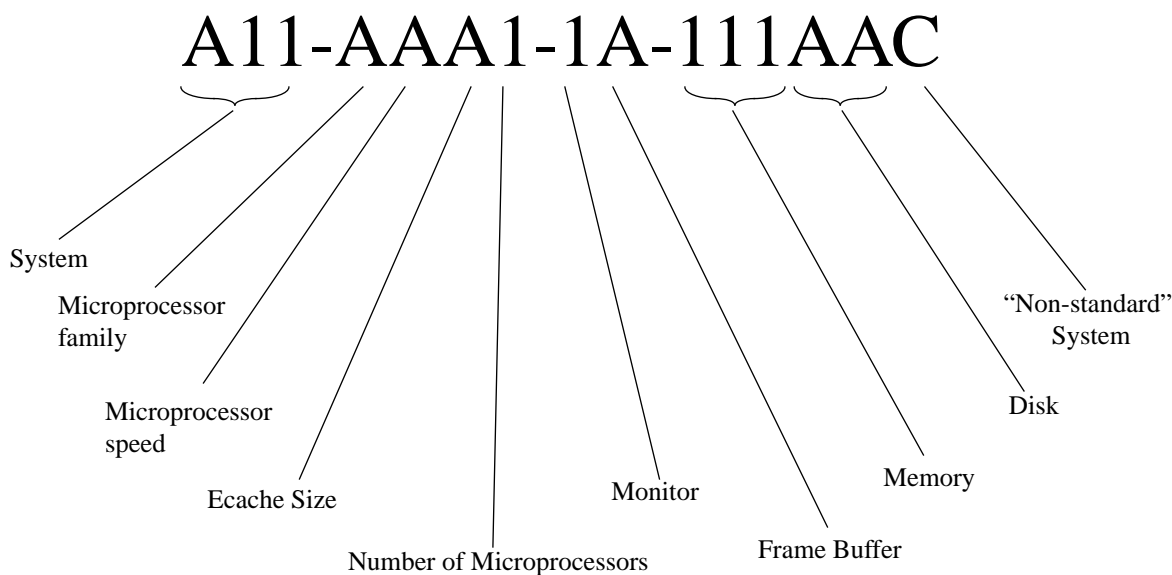
(Note: A = alpha character, 1 = numeric character, C = optional alpha or numeric character)

Model Key (Subset of Part Number Definitions)

System	Monitor	Frame Buffer	Disk
A16 = Sun Ultra 30	1 = 20-inch color	E = Creator	AB = 2.1 GB
	2 = 17-inch color	F = Creator3D	AC = 4.2 GB
Microprocessor Family	3 = 17-inch color, low cost	G = FFB2 Creator graphics	CB = 2.1 GB + CD-ROM
U = UltraSPARC™	4 = 20-inch color (Southern Hemisphere)	H = FFB2 Creator3D graphics	CC = 4.2 GB + CD-ROM
Microprocessor Speed	5 = 17-inch color (Southern Hemisphere)	N = No frame buffer	DB = 2 x 2.1 GB
D = UltraSPARC 250 MHz			DC = 2 x 4.2 GB
E = UltraSPARC 300 MHz	6 = 17-inch color, low cost (Southern Hemisphere)		EC = 2 x 4.2 GB + CD-ROM
Ecache Size	7 = 24-inch color	**Memory**	NN = Diskless
B = 1 MB		128 = 128 MB	
C = 2 MB		256 = 256 MB	
		512 = 512 MB	
		001 = 1 GB	

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Sun Ultra 30 Model 250

Part Number	System
	250-MHz UltraSPARC-II with 1-MB Ecache, 128-MB memory, 4.1-GB internal Fast/Wide disk
A16-UDB1-1G-128AC	– 20-inch color monitor, Creator single-buffer graphics
A16-UDB1-1H-128AC	– 20-inch color monitor, Creator3D double-buffer graphics
A16-UDB1-7H-128AC	– 24-inch color monitor, Creator3D double-buffer graphics

Sun Ultra 30 Model 300

Part Number	System
	300-MHz UltraSPARC-II with 2-MB Ecache, 4.1-GB internal Fast/Wide disk
A16-UEC1-1G-128AC	– 20-inch color monitor, Creator single-buffer graphics, 128-MB memory
A16-UEC1-1H-128AC	– 20-inch color monitor, Creator3D double-buffer graphics, 128-MB memory
A16-UEC1-7H-128AC	– 24-inch color monitor, Creator3D double-buffer graphics, 128-MB memory
A16-UEC1-1G-512AC	– 20-inch color monitor, Creator single-buffer graphics, 512-MB memory
A16-UEC1-1H-512AC	– 24-inch color monitor, Creator3D double-buffer graphics, 512-MB memory

Ordering

Sun microsystems

Ordering Guidelines and Notes

- Memory
  - The Ultra 30 supports 2 GB of main memory. The DIMMs are of the same type as those used in the SPARCstation™ 20, Ultra 1, or Ultra 2 systems. This architecture currently accepts 16-, 32-, 64-, or 128-MB memory modules.
  - The Ultra 30 can accommodate up to 16 DIMM modules in increments of two. DIMM modules within each pair *must* be of the same type. DIMM module pairs or sets of four, may be mixed. However, for maximum performance and throughput, DIMMs should be configured in quads of identical type.
- Floppy drive (optional)
  - Power cabling is provided for one floppy drive.
- SCSI
  - The internal SCSI host controller operates in Fast-20 mode by default. Installation of non-FAST-20 devices, although allowed, will decrease overall SCSI performance.
  - A maximum of SCSI spec 14 disk drives or 15 devices, one controller seven CD-ROM or tape drives can be addressed by the on-board Fast-20 SCSI controller. Internal cabling is provided for three devices.
  - The total combined SCSI cable and internal SCSI bus length must not exceed three meters for Fast/Wide operation or 1.5 meters for Fast-20 (UltraSCSI) operation.
  - To guarantee Fast-20 speeds on all devices on the bus, it is recommended that:
    - A maximum of two SPARCstorage™ UniPacks using Fast-20 cables be connected to the external connector.
    - All devices on the SCSI bus should be Fast-20 devices. (Non-Fast-20 devices may cause the internal devices to run at Fast/Wide speeds, but are supported.)
- Keyboard
  - Type 4 keyboards are not supported on the Ultra 30. Order Type 5 keyboards, when applicable.

Ordering

Sun Ultra 30 Ordering Information *(cont.)*

Below is a comprehensive list of system expansion, networking, graphics, and multimedia options that are supported by Sun Ultra 30 systems. Many of the options listed below have been retired and can no longer be ordered from Sun, but are shown here for reference purposes. Refer to the Sun Price Book and configuration guides for currently available option listings, configuration notes, and ordering information. When no maximum number is listed, refer to ordering or configuration notes for that option.

Part Number	Option description	Maximum number supported	Comments
Memory			
X7001A	32-MB, 60-ns DIMM memory expansion (2 x 16 MB)	4	These are all
X7002A	64-MB, 60-ns DIMM memory expansion (2 x 32 MB)	4	pairs of
X7003A	128-MB, 60-ns DIMM memory expansion (2 x 64 MB)	4	DIMM units
X7004A	256-MB, 60-ns DIMM memory expansion (2 x 128 MB)	4	
Mass Storage— Internal			
X6520A	2.1-GB 7200-rpm Fast/Wide UltraSCSI disk	2	
X5214A	4.2-GB 7200-rpm Fast/Wide UltraSCSI disk	2	
X5251A	9.1-GB 7200-rpm Fast/Wide UltraSCSI disk	2	
X6161A	SunCD™12x CD-ROM drive with cable (for FlexiPack)	1	
X6004A	3.5-inch 1.44-MB manual eject floppy drive (triple density)	1	
X6280A	12–24 GB 4mm DDS-3 tape drive	1	
X6203A	14-GB 8mm tape drive	1	
Mass Storage— External			
X814A	5.0-GB 8mm tape backup drive, desktop storage module	2	
X827A	20-GB 4mm tape autoloader, desktop storage module	2	
X580A	535-MB Fast SCSI-2 desktop disk pack	4	
X545A	1.05-GB Fast SCSI-2 desktop disk pack	4	
X567A	2.1-GB Fast SCSI-2 desktop disk pack	4	
X737A	2.1-GB Fast SCSI-2 desktop disk pack	4	
X579A	SunCDPlus™, desktop storage pack	2	
X660A	150-MB QIC tape drive, desktop storage pack	2	
X822A	5.0-GB 4mm tape drive, desktop storage pack	2	
X834A	10-GB 8mm backup tape drive, desktop storage module	2	
X844A	14.0-GB 8mm tape drive, desktop storage pack	2	

Part Number	Option description	Maximum number supported	Comments
Mass Storage— UniPack	*The following UniPack options come with a 68–68 pin SCSI cable:*		
X5101A	1.05-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5151A	1.05-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5203A	2.1-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5209A	4.2-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack (68–68 pin)	2	
X5253A	9.1-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack (68–68 pin)	2	
X6151A	SunCD 4x CD-ROM UniPack	1	
X6101A	2.5-GB QIC tape UniPack	2	
X6201A	14-GB 8mm tape UniPack	2	
X6208A	14-GB 8mm tape UniPack	2	
X6251A	5-GB 4mm tape UniPack	2	
X5157A	SunCD 12x CD-ROM UniPack	2	
X6261A	4–8 GB 4mm DDS2 drive	2	
X6280A	12–24 GB 4mm DDS3 tape drive	2	
X6230A	20–40 GB 8mm tape drive	2	
	The following UniPack options come with a 50–68 pin SCSI cable:		Note: 68-pin is required on the Ultra 30; these options supported if the correct cable is substituted
X5102A	1.05-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5152A	1.05-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5204A	2.1-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	4	
X5213A	4.2-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	2	
X5254A	9.1-GB 7200-rpm Fast/Wide SCSI-2 disk UniPack	2	
X6152A	SunCD 4x CD-ROM UniPack	1	
X6102A	2.5-GB QIC tape UniPack	2	
X6202A	14-GB 8mm tape UniPack	2	
X6209A	14-GB 8mm tape UniPack	2	
X6252A	5-GB 4mm tape UniPack	2	
X5158A	SunCD 12x CD-ROM UniPack	2	
X6262A	4–8 GB 4mm DDS-2 tape drive	2	
X6281A	12–24 GB 4mm DDS-3 tape drive	2	
X6231A	20–40 GB 8mm tape drive	2	
Mass Storage— MultiDisk Pack			
X569A	4.2-GB SCSI MultiDisk Pack (2 x 2.1-GB Fast SCSI-2 disk)	2	
X570A	8.4-GB SCSI MultiDisk Pack (4 x 2.1-GB Fast SCSI-2 disk)	1	
X739A	8.4-GB 7200-rpm MultiDisk Pack (4 x 2.1-GB Fast SCSI-2 disk)	1	
X748A	8.4-GB SCSI MultiDisk Pack (2 x 4.2-GB Fast SCSI-2 disk)	2	
X749A	16.8-GB SCSI MultiDisk Pack (4 x 4.2-GB Fast SCSI-2 disk)	1	
X771A	2.1-GB SCSI MultiDisk Pack (2 x 1.05-GB)	2	
X5211A	8.4-GB (2 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	2	
X5212A	16.8-GB (4 x 4.2-GB) 5400-rpm Fast/Wide SCSI-2 MultiPack	1	
X570A	4.2-GB SCSI MultiDisk Pack (4 x 1.05-GB)	1	
X738A	4.2-GB 7200-rpm MultiDisk Pack (2 x 2.1-GB)	2	

Ordering

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Part Number	Option description	Maximum number supported	Comments
Mass Storage— **FlexiPack**	*The following UniPack options come with a 68–68 pin SCSI cable:*		
X6057A	DLT 4000	2	
X6060A	DLT 7000	2	
X6290A	72–144 GB 4mm DDS3 autoloader tape FlexiPack	2	
X6284A	12–24 GB 4mm DDS3 tape FlexiPack	2	
X6264A	4–8 GB 4mm DDS3 tape FlexiPack	2	
X6232A	20–40 GB 8mm tape FlexiPack	2	
X6210A	14-GB 8mm tape FlexiPack	2	
X6159A	SunCD 12x CD-ROM FlexiPack	2	
	The following UniPack options come with a 50–68 pin SCSI cable:		Note: 68-pin is required on the Ultra 30; these options supported if the correct cable is substituted
X6058A	DLT 4000	2	
X6061A	DLT 7000	2	
X6291A	72–144 GB 4mm DDS3 autoloader tape FlexiPack	2	
X6285A	12–24 GB 4mm DDS3 tape FlexiPack	2	
X6265A	4–8 GB 4mm DDS3 tape FlexiPack	2	
X6233A	20–40 GB 8mm tape FlexiPack	2	
X6211A	14-GB 8mm tape FlexiPack	2	
X6150A	SunCD 12x CD-ROM FlexiPack	2	
Mass Storage— **MultiPack**			
X5511A	4.2-GB (2 x 2.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5512A	12.6-GB (6 x 2.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5513A	25.2-GB (12 x 2.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5514A	8.4-GB (2 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5515A	25.2-GB (6 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5516A	50.4-GB (12 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5501A	8.4-GB (2 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5502A	16.8-GB (4 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5503A	25.2-GB (6 x 4.2-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5504A	18.2-GB (2 x 9.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5505A	36.4-GB (4 x 9.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
X5506A	54.6-GB (6 x 9.1-GB) 7200-rpm Fast/Wide SCSI-2 MultiPack	1	
Mass Storage— **SPARCstorage**			
X6227A	SPARCstorage Library Model 8/140, 140-GB 8mm tower unit	1	
X849A	SPARCstorage Library Model 8/140, 140-GB 8mm stackable unit	1	
X867A	SPARCstorage Library Model 8/140, 140-GB 8mm two drives and barcode reader, tower unit	1	
X869X	SPARCstorage Library Model 8/140, 140-GB 8mm two drives and barcode reader, stackable unit	1	
X6225A	SPARCstorage Library Model 8/400, 400-GB 8mm stackable unit and two drives, barcode reader	1	

Part Number	Option description	Maximum number supported	Comments
Input Devices			
X180A	SunButtons™ 32-key function I/O device	1	
X190A	SunDials™ 8-dial interactive graphics I/O device for 3-D	1	
X495A	SunMicrophone™	1	
SUNX-MICII/G5	SunMicrophone-II	1	Supplied in system ship kit
PCI Expansion Cards			
X1033A	10/100 BASE-T with MII PCI Adapter	3	
X1034A	PCI Quad Fast Ethernet Controller	3	
X1039A	SunLink™ Token Ring Interface/PCI	4	Universal
X1040A	High-speed Serial Interface PCI Adapter (HSI)	3	
X1041A	Serial Asynchronous Interface (SAI) PCI adapter	4	Universal
X1035A	SunFDDI™ single-attach PCI Adapter (SAS)	3	
X1036A	SunFDDI dual-attach PCI Adapter (DAS)	3	
X1032A	SunPCI UltraSCSI and 10/100-Mbit buffered Ethernet card	3	
Monitors and Graphics			
X3658A	Creator, series 2, 24-bit color, single-buffered graphics accelerator, vertical board orientation, and cable	2	UPA
X3659A	Creator3D, series 2, 24-bit color, double-buffered graphics accelerator, vertical board orientation, and cable	2	UPA
X3660A	PGX color frame buffer and cable	4	PCI Card
X7103A	Entry 17-inch color monitor		One monitor per graphics accelerator
X328A	17-inch color monitor		
X267A	20-inch color monitor		
X7124A	Wide-screen 24-inch color monitor		
Printers			
CPRN-360	NeWSprinter CL+™ color printer		
NPRN-20	NeWSprinter™ 20 laser printer		
SPRN-600	SPARCprinter™ II		
SPRN-E	SPARCprinter E laser printer		
SPRN-EC	SPARCprinter EC color laser printer		
Other Options			
X903A	1.2 meter 50–68 pin SCSI adapter cable	1	
X904A	2.0 meter 50–68 pin SCSI adapter cable	1	
X907A	Optional power cable, CPU to monitor, 1.5 meter	1	
X908A	Optional power cable, CPU to monitor, 2.5 meter	1	
X467A	MII-AUI Converter	1	

Ordering

Part Number	Option description	Maximum number supported	Comments
Type 5 Country Kits			Kits contain a Type 5 or 5c keyboard, optical mouse and pad, microphone, and a localized power cord
X3500A	North American	1	
X3550A	North American Universal	1	
X3540A	UNIX®	1	
X3551A	UNIX Universal	1	
X3552A	Euro UNIX (Power Cordless)	1	
X3502A	French	1	
X3503A	German	1	
X3504A	Swiss-French	1	
X3505A	Swiss-German	1	
X3506A	Swedish	1	
X3577A	Finnish	1	
X3507A	U.K.	1	
X3547A	U.K. UNIX	1	
X3570A	Norwegian	1	
X3571A	Portuguese	1	
X3572A	Spanish	1	
X3573A	Danish	1	
X3574A	Italian	1	
X3575A	Netherlands	1	
X3544A	Taiwan	1	
X3545A	Korean	1	
X3546A	Japanese	1	
X3542A	Japanese UNIX	1	
X3576A	Australian	1	
X3579A	Canadian Bilingual	1	

Sun™ Ultra™ 30 Upgrades

Sun upgrades offer customers superior investment protection for their existing Sun™ equipment.
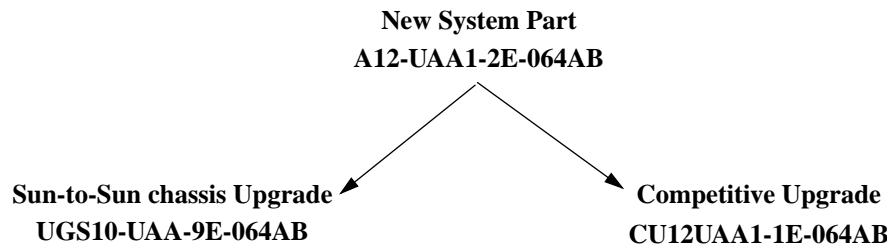
Key Messages

- Sun offers customers a variety of flexible upgrade paths to the most popular Sun systems

- Choose from chassis-only to full-system upgrades

- Sun upgrades allow as many components as possible to be carried forward, to protect the customer's hardware investment

- Existing investments in non-Sun hardware can be preserved by upgrading to Sun through competitive full-system upgrades

- SPARCstation™ 20 or Ultra™ upgrades offer superior value by allowing the migration of memory to Sun Ultra 30 systems

Sun Ultra 30 Upgrade Paths

From	Receive	Return
Full system upgrade from Any SPARCstation or Ultra to Ultra 30 Model 250 or 300	Complete Ultra 30 system	Complete SPARCstation or Ultra workstation
Competitive upgrade to Ultra 30 Model 250 or 300	Complete Ultra 30 system	Complete competitive workstation
Module upgrade from Ultra 30 Model 250 to Ultra 30 Model 300	Ultra 300 CPU Module	Ultra 250 CPU Module

Sun microsystems

Sun Ultra 30 Upgrades *(cont.)*

Marketing Upgrade Numbering Scheme

New System Part
A12-UAA1-2E-064AB

Sun-to-Sun chassis Upgrade
UGS10-UAA-9E-064AB

Competitive Upgrade
CU12UAA1-1E-064AB

- The differences between the upgrade and new system part numbers lie in the first eight characters; the ten trailing characters carry the same interpretation as new system parts.
- Sun-to-Sun upgrades begin with U or UG; competitive upgrades begin with CU.
- Sun-to-Sun upgrades show the "from" path system in the first three characters that follow the U or UG.
- Character representations following the "from" system have the same interpretation as new system parts, but dashes may be removed from left to right, as necessary, to meet the maximum part number length of 18 characters.

Sun Ultra 30 Upgrade to Model 250

Part Number	Model 250
UG14-6UDB19E2000AC	Chassis upgrade from SPARCstation 20 to Ultra 30, 250-MHz UltraSPARC™-II, Creator Graphics Series 2, memory less, 4-GB disk, Solaris™ workstation license
UG14-6UDB19F2000AC	Chassis upgrade from SPARCstation 20 to Ultra 30 250 MHz UltraSPARC-II, Creator3D graphics Series 2, memory less, 4-GB disk, Solaris workstation license
UG14-6UDB19E2128AC	Chassis upgrade from Ultra 3000, SPARCstation 10 or 20 to Ultra 30 250-MHz UltraSPARC-II, Creator Graphics Series 2, 128 MB of memory, 4-GB disk, Solaris workstation license
UG14-6UDB19F2512AC	Chassis upgrade from Ultra 3000, SPARCstation 10 or 20 to Ultra 30 250-MHz UltraSPARC-II, Creator3D graphics Series 2, 512 MB of memory, 4-GB disk, Solaris workstation license
UGFS-6UDB11E2128AC	Full system upgrade from any SPARCstation to Ultra 30 250MHz UltraSPARC-II, Creator Graphics Series 2, 128 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license

Sun Ultra 30 Upgrade to Model 250 *(cont.)*

Part Number	Model 250
UGFS-6UDB11F2512AC	Full system upgrade from any SPARCstation to Ultra 30 250-MHz UltraSPARC-II, Creator3D graphics Series 2, 512 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license
CU-6UDB1-1E2-128AC	Full system upgrade of competitive systems to Ultra 30 250-MHz UltraSPARC-II, Creator Graphics Series 2, 128 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license
CU-6UDB1-1F2-512AC	Full system upgrade of competitive systems to Ultra 30 250-MHz UltraSPARC-II, Creator3D graphics Series 2, 512 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license

Sun Ultra 30 Upgrade to Model 300

Part Number	Model 300
UG-A16-M250-M300	Module upgrade for Ultra 30 (A16) from 250 MHz to 300 MHz
UG14-6UEC19E2000AC	Chassis upgrade from Ultra system, SPARCstation 20 to Ultra 30 300MHz UltraSPARC-II, Creator Graphics Series 2, memory less, 4-GB disk, Solaris workstation license
UG14-6&EC19F2000AC	Chassis upgrade from Ultra system, SPARCstation 20 to Ultra 30 300-MHz UltraSPARC-II, Creator3D graphics Series 2, memory less, 4-GB disk, Solaris workstation license
UG14-6UEC19E2128AC	Chassis upgrade from Ultra 3000, SPARCstation 10 or 20 to Ultra 30 300-MHz UltraSPARC-II, Creator Graphics Series 2 workstation, memory less, 128 MB of memory, 4-GB disk, Solaris workstation license
UF14-6UEC19F2512AC	Chassis upgrade from Ultra 3000, SPARCstation 10 or 20 to Ultra 30 300-MHz UltraSPARC-II, Creator3D graphics Series 2, memory less, 512 MB of memory, 4-GB disk, Solaris workstation license
UGFS-6UDB11G-128AC	Full system upgrade from any SPARCstation to Ultra 30 300-MHz UltraSPARC-II, Creator3D graphics Series 2, 128 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license
CU-6UEC1-1H-512AC	Full system upgrade of competitive systems to Ultra 30 300-MHz UltraSPARC-II, Creator3D double-buffer graphics Series 2, 512 MB of memory, 4-GB disk, 20-inch color monitor, Solaris workstation license

Sun microsystems

Service and Support

SunSpectrum^{SM} is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs — ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. SunSpectrum provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris™ operating system software, and telephone support for Sun™ software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value it represents. Customers should check with their local SunService™ representative for program/feature variance and availability in their area.

FEATURE	SUNSPECTRUM^{SM} PLATINUM^{SM} Mission-Critical Support	SUNSPECTRUM^{SM} GOLD^{SM} Business-Critical Support	SUNSPECTRUM^{SM} SILVER^{SM} Systems Support	SUNSPECTRUM^{SM} BRONZE^{SM} Self Support
Systems Features				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
Account Support Features				
Service account management team	Yes	No	No	No
Personal technical account support	Yes	Yes	No	No
Account support plan	Yes	Yes	No	No
Software release planning	Yes	No	No	No
On-site account reviews	Monthly	Semi-annual	No	No
Site activity log	Yes	Yes	No	No
Coverage / Response Time				
Standard telephone coverage hours	7 day/24 hour	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday
Standard on-site coverage hours	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday	N/A
7 day/24 hour telephone coverage	Yes	Yes	Option	No
7 day/24 hour on-site coverage	Yes	Option	Option	N/A
Customer-defined priority setting	Yes	Yes	Yes	No
– Urgent (phone/on-site)	Live transfer/ 2 hour	Live transfer/ 4 hour	Live transfer/ 4 hour	4 hour / N/A
– Serious (phone/on-site)	Live transfer/ 4 hour	2 hour/next day	2 hour/next day	4 hour / N/A
– Not critical (phone/on-site)	Live transfer/ customer convenience	4 hour/ customer convenience	4 hour/ customer convenience	4 hour / N/A
Additional contacts	Option	Option	Option	Option

FEATURE	SUNSPECTRUM PLATINUM Mission-Critical Support	SUNSPECTRUM GOLD Business-Critical Support	SUNSPECTRUM SILVER Systems Support	SUNSPECTRUM BRONZE Self Support
Enhanced Support Features				
Mission-critical support team	Yes	Yes	No	No
Sun Vendor Integration Program (SunVIP™)	Yes	Yes	No	No
Software patch management assistance	Yes	No	No	No
Field change order (FCO) management assistance	Yes	No	No	No
Remote Systems Diagnostics				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
Software Enhancements and Maintenance Releases				
Solaris enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
Internet and CD-ROM Support Tools				
SunSolve™ license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier[SM] service	Yes	Yes	Yes	Yes

Glossary

24-bit color	The ability to render objects from a palette of 16.7 million colors. It is often referred to as true color and results in much more realistic shading of 3-D objects for enhanced image quality.
3D-RAM	Dual-ported video memory with graphics functionality built into the memory chip.
100BASE-T	See Fast Ethernet.
antialiasing	A graphics technique that greatly enhances the quality of images by eliminating many of the inaccuracies (jaggies) inherent to rendering on a raster display. Typically found only in high-end graphics systems.
Creator Graphics Series 2	Fast Frame Buffered, Second Version. A new generation of Creator Graphics.
DIMM	Double Inline Memory Module. A memory unit that can come in a variety of sizes, such as 16, 32, 64, and 128 MBs.
Fast Ethernet	IEEE standard for 100-Mb Ethernet.
MII	Media Independent Interface. Used for connecting external transceivers to Fast Ethernet.
NFS™	Sun's distributed computing file system.
ODBC	Open Database Connectivity.
OpenGL™	The de facto standard software interface for graphics hardware that allows programmers to create interactive 3-D applications. OpenGL provides a full-featured, network-transparent application programming interface.
PCI	Peripheral Component Interconnect. A industry-standard for connecting peripherals such as disk drives, tapes drives, and other devices used in the PCs.
PLBwire93	The Picture Level Benchmark for wireframe performance. A benchmark standardized by the National Computer Graphics Associated GPC committee. The value represents the geometric mean performance on several commonly used 3-D wireframe operations.
PLBsurf93	The Picture Level Benchmark for 3-D surface performance. A benchmark standardize by the National Computer Graphics Associated GPC committee. The value represents the geometric mean performance on several commonly used 3-D surface operations.
UPA	Ultra Port Architecture. A high-speed, crossbar-oriented, packet-switched mother board interconnect.
V9	Version 9 of the SPARC™ definition.

VIS™

Visual Instruction Set. The UltraSPARC™ processor implements a special instruction set that is primarily aimed at image and video processing. Some of the instructions allow the CPU to directly access and operate on image data with a high degree of parallelism. Other instructions provide facilities for formatting and moving data at very high rates of speed both within the CPU, and between the CPU and the other system components.

XGL™

A foundation geometry-oriented 2-D/3-D graphics library that provides high functionality and performance to geometry applications and application program interfaces (APIs).

XIL™

A foundation imaging-oriented graphics library providing high functionality and performance to imaging applications.

Glossary